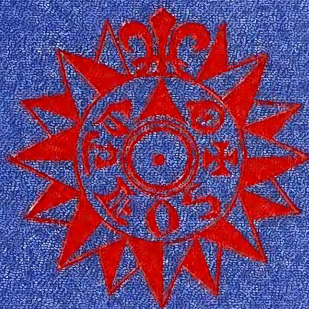


THE CONQUEST OF THE ATLANTIC



INGRI AND EDGAR PARIN D'AULAIRE

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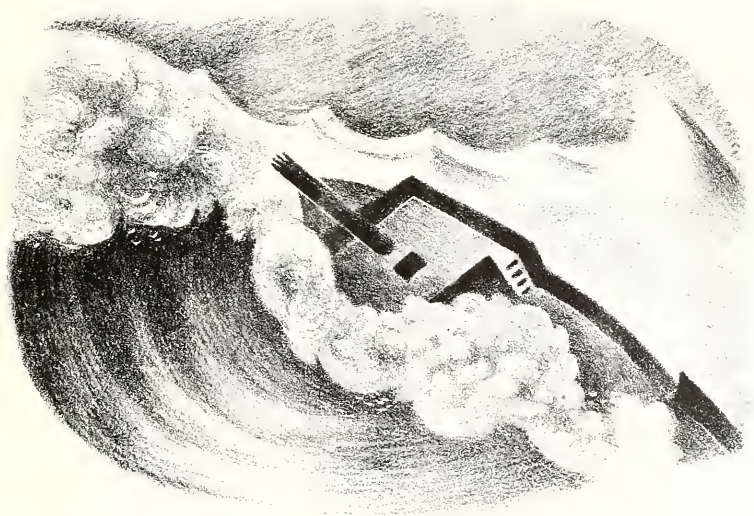
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THE CONQUEST OF THE ATLANTIC

TEXT AND LITHOGRAPHS BY

Ingri and Edgar Parin d'Aulaire



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Mankind is a weaver who from the wrong side works on the carpet of time. The day will come when he will see the right side and understand the grandeur of the pattern he with his own hands has woven through the centuries without seeing anything but a tangle of strings.

LAMARTINE





THE CONQUEST OF THE ATLANTIC

Long ago the world was thought to be an island rising from the waters of a waste and desolate sea. On the island was a great inner sea called the Mediterranean, and the lands bordering on this sea were considered the only habitable world. The Mediterranean was plowed by merchant ships from Europe, Asia, and Africa, but they seldom ventured past the "Pillars of Hercules," now called the Strait of Gibraltar.

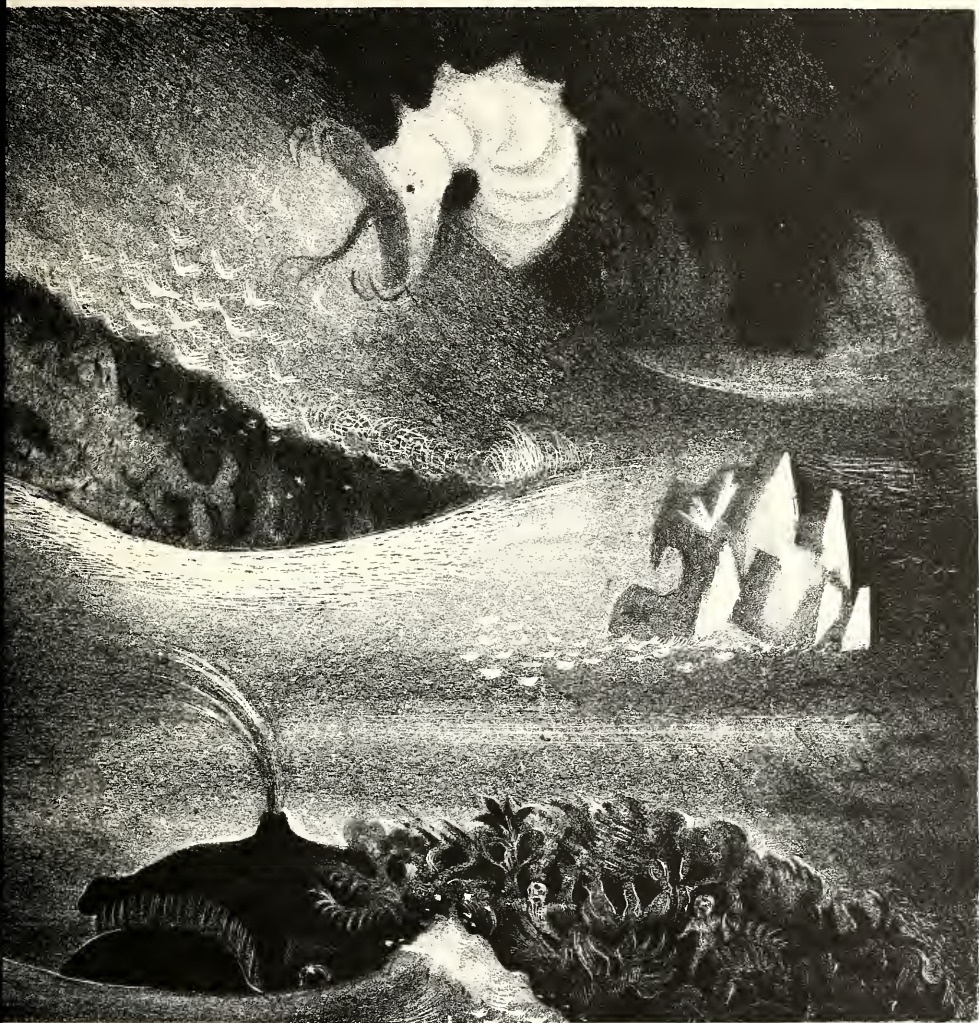
This little world was surrounded by almost impenetrable mysteries. In the North, fog and frost made a chaotic, unstable element of land, sea, and air.

In the South, the burning sun melted land and sea into one boiling, seething mass. And far, far away, beyond mystic jungles and inaccessible mountains were the eastern wonderlands of golden towers, precious stones, and fragrant spices—mysterious Cathay, and perhaps even the Terrestrial Paradise.

In the West the unnavigable, unruly waves of Oceanus, the fearful "Sea of Darkness," washed the shores of Europe and Africa, stretching forth to the end of the world. There were tales of beautiful islands far out from land, but woe to him who would set forth in search of them! They would retreat from his vision or vanish beneath the waves. The sun would fall hissing into the sea, the light would fail, and in the utter darkness no anchoring place could be found.



Caught by rapid currents the ship would drift outward. In the darkness strange monsters lurked, and horrible specters blew roaring hurricanes through the ice-cold caves of their nostrils. And from the deepest depth of the ocean Satan himself would reach forth his black and hooked claws and seize the bold



intruder and drag it down. Even if the ship escaped all these terrors, it would finally drift to the edge of the world. There the ocean fell into the yawning abyss, and the ship would go down the smooth green cataracts and crash at the foundation of the world.

There was a story that once a ship had happened to find a narrow bridge of water that led like a rainbow across the gaping chasm. Beyond the chasm was a wonderful country, with streams of wine flowing in beds of gold and precious stones, mountains that cooled the air in summer and radiated warmth in winter, cities with golden towers and people who could fly through the air like birds.

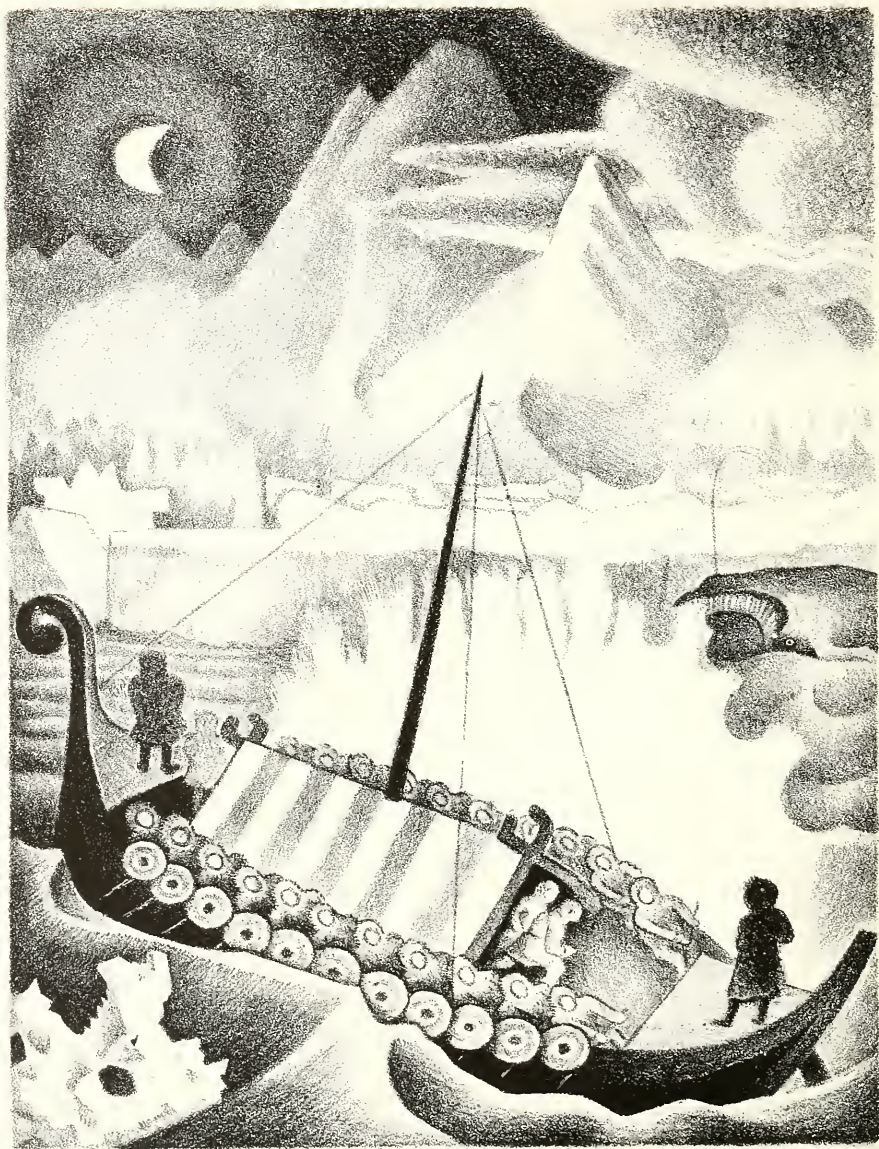
Many tales like these were told about the Atlantic, but, as the ships of the Mediterranean were not seaworthy enough and the means of navigation inadequate for ocean voyages, only a few of the ships that ventured out of sight of land ever came back.



On the shores of Ultima Thule—the northernmost edge of the habitable world—the Norsemen lived on the shallow coast plains with barren mountains behind them and the sea in front. The mountains hindered travel and the sea encouraged it. So they built boats and became daring sailors. Their sturdy but loosely built dragonships followed the wave slope like living sea-serpents. And the Norsemen knew how to find their course even out of sight of land. They steered by the sun and the stars, by the color of the sea, by the whales and the flight of birds. In springtime when the northern nights are short and light the Norsemen would set sail. They made longer and longer voyages. They plundered and explored the coasts of Europe. They sailed far out to the West and came upon a black land with burning mountains and boiling springs, with green grass and ice. This land they called Iceland, and they settled there about A.D. 800. For a century it was the western outpost of the Atlantic.

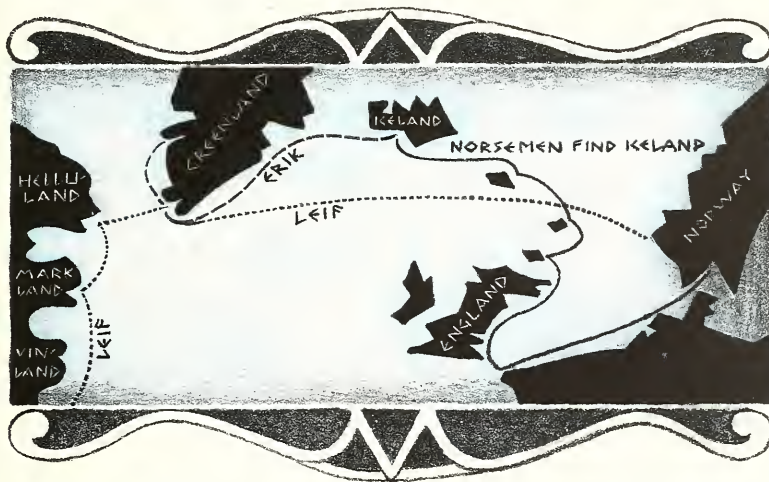
From Iceland sailed Eric the Red. He was in search of land that had been glimpsed still farther West. Against wind and waves he sailed into the unknown. At last he saw snowclad mountains, but a solid belt of ice barred his way. Eric followed the ice southward until he rounded a cape, now called Cape Farewell. Here the water was warmer and free from ice, and he found deep fjords and fertile soil.





After three years he returned to Iceland with a colorful tale of the new country, which he called Greenland. And so alluringly did he describe the land that he soon sailed westward again at the head of a fleet and many settlers. Only part of the expedition arrived in Greenland and settled in Ericsfjord.

Leif, Eric's son, was a still bolder sailor than his father. In one daring trip he sailed directly from Greenland to Norway without landing, thus accomplishing the first real trans-Atlantic voyage.



When he returned to Greenland, Leif heard rumors about a wind-driven sailor who had sighted a strange and beautiful coast to the West. Leif, the adventurer, at once hoisted sail and set off in search of the new land. He soon found this land (probably what is now called Labrador) and followed it southward, exploring the coast and naming it. He called it "Helleland" (Rockland), "Markland" (Meadowland), and "Vinland" (Fruitland). Leif had too few men with him to settle, for he was only a trader, so he returned to Greenland with a shipload of timber. This was a precious cargo for Greenland, as there was no wood there.

Later a man, Thorfinn Karlsefne, at the head of a group of pioneers attempted to colonize Vinland. But after severe skirmishes with the natives he had to give up and return to Greenland.

These expeditions took place about the year A.D. 1000. There are vague reports of several expeditions being made to Vinland for timber in the next few hundred years. But gradually the colony on Greenland died out, and the story of Vinland was lost to the world for centuries.

The raids of the Vikings stirred the whole of Europe, but their far-reaching trans-oceanic ventures passed almost unnoticed.

There are records that Basque fishermen in the twelfth century hunted whales and fished for cod off the Newfoundland Banks, but to most of the world until the fifteenth century the Atlantic again became an endless waste with nothingness beyond it.



During these centuries, the eyes of Europe were turned to the East, toward India and far Cathay. The Crusaders had brought back tales of those dreamlands with immense riches of gold and silver, silks and satins, perfumes and spices. Merchants from Venice and Genoa had followed the Crusaders to Constantinople to buy of the eastern goods. These brought enormous prices, for the desert caravan routes were long and dangerous, but the demand was great and a flourishing trade had been established.

At the end of the Crusades the Moslem wall blocked the land routes to the East and the merchant-princes had to find a new way to India or lose their trade.

They had learned that the fertile Spice Isles lay far to the South in the Indian Ocean directly under the sun. Perhaps there was no burning zone at all. Perhaps the Atlantic might be hiding treasure islands in the South, perhaps there was some truth in the legend that the Phoenicians, ancient traders, had sailed around Africa and reached India by sea.

The enterprising Genoese sent expeditions down the African coast. They found again the blooming isles of Madeira and the Canaries, once known by the antique world, and they even visited the Azores far out in the sea. But all efforts



to penetrate further South failed. No ship ever returned from beyond Africa's ghostly Cape Non. The Atlantic still held its secrets.

Prince Henry of Portugal, Henry the Navigator, scientist and organizer, was to make his small country the pathfinder of the Atlantic and the leader of the great European expansion.

On the St. Vincent promontory, with an unbarred view over the vast mysterious ocean, Prince Henry built an observatory and founded a school where his pilots were instructed by learned men from all over Europe. Below in a wind-protected bay was his ship-yard. Here Genoese ship builders developed the caravels, those many-sailed ships that were to conquer Cape Non and the terrors of the South.

On the outer point of the promontory Prince Henry built an observatory. Here he studied nautical astronomy and founded a school for his pilots. Europeans had learned much of the seaman's art by experience and much from those skilled astronomers, the Arabs. They knew the use of the cross staff and astrolabe and could roughly determine latitude in clear weather. Even when the sun and stars were hidden by clouds, a pilot could find his direction by a primitive compass, a magic needle always pointing North to South when put into a straw and set afloat on water. But to determine longitude the pilot had only very inexact means, the sand glass and the log.

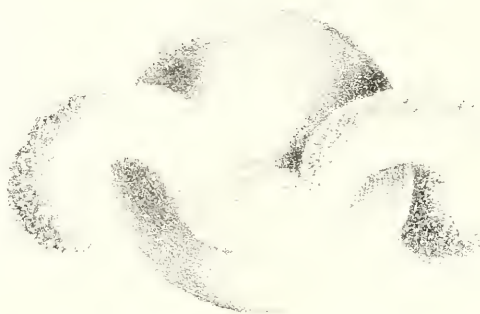
Piloted by his best captains, and with good supplies and maps of the African coast as far as it was known, Prince Henry sent his ships southward in search of the seaway to India. Down the shallow and unhealthy coast, frightened by sudden squalls, hampered by the doldrums, his pilots one after another rounded Cape Non and battled their way to the South. Where they landed, they erected big stone crosses and claimed the land for Portugal. They returned with slaves, ivory, and rich chart material. And again they set off, finally reaching Cape Verde, the green cape lying under the burning sun. Here the coast turned to the East, and the joyous message reached Prince Henry that now the seaway to India was found. But shortly before his death he had to learn that the coast again turned to the endless South. He was not to live to see the victorious fulfillment of his dreams and labor, but in the shadows of the rounded capes he had buried forever the medieval terrors of the Atlantic.



Prince Henry's work was continued by his great pupil Bartholomeu Dias. In 1487 Dias set off southward with two ships and a small vessel carrying reserves. He sailed along the coast until he had the sun in the zenith. A new sky arose with constellations never before seen by the Portuguese. Abruptly the coast ended in a cape, and no further land barred his way to the East. The seaway to India lay open before him.

On his way home Dias left the coast. Out in the open Atlantic, relying entirely on observations and good navigation, he was quickly and comfortably carried homeward by steady easterly winds, later called the trade winds.

In 1497, Vasco da Gama followed Dias's route of the trade winds, rounded the stormy Cape of Good Hope, and after an adventurous voyage across the Indian Ocean was the first to reach the Orient by way of the Atlantic.



The far-reaching Portuguese voyages and a vogue of studying antique writers revived an old idea of the world's being a globe. There dawned the idea of land on the other side of the Atlantic. Carved pieces of wood, bamboos, and strange fruits sometimes were washed ashore after long western storms and seemed to prove this theory. As India lay so very far to the East it might be much nearer to the West. Nobody actually dared to sail down westward in search of India; horrible obstacles might be in their way—and how could a ship ever be able to sail uphill back again? But learned men began to make globes showing the known countries of the world and to make maps showing the Atlantic Ocean as the water between Europe and Asia.

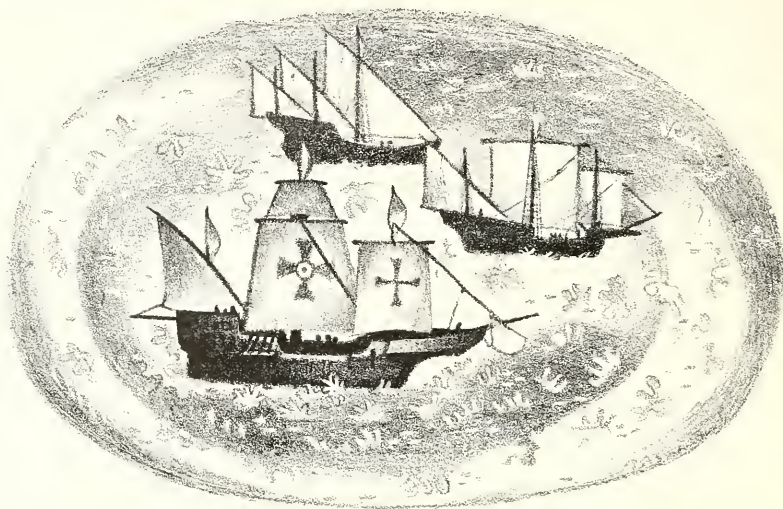


An eager student of these maps was Christopher Columbus, the son of a poor Genoese weaver. He had gone early to sea, learned what was known of navigation, and determined to become a great discoverer.

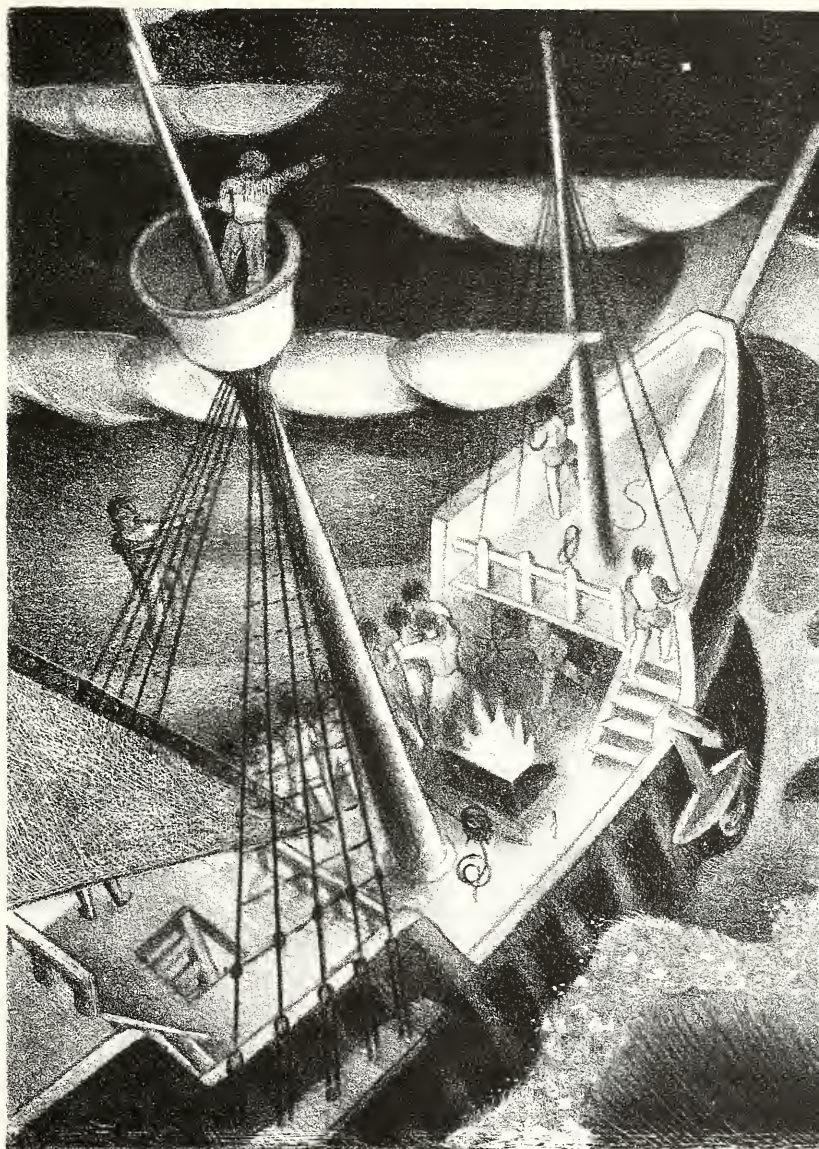


He collected all possible chart material on the Atlantic and

He tried to interest various European princes in financing an expedition, but made such excessive claims for riches and power for himself that for many years he met with no encouragement. Finally he succeeded in interesting Queen Isabella of Castile and King Ferdinand of Spain, who helped him to fit out an expedition of three ships.



With these ships, the *Santa Maria*, the *Niña*, and the *Pinta*, manned by an undisciplined crew of criminals, soldiers, and monks, Columbus sailed for the Canaries. On the sixth of September 1492, he started from there in search of the Indies on a fantastic voyage that was to last for five weeks. He kept in the region of the trade winds, steering as he thought between the legendary isles of Antiglia and St. Brandamus. The further they advanced, the greater grew the terror of his men, and, when they sailed into great stretches of seaweed, the Sargasso Sea, where no bottom could be found and all winds ceased, they wanted to throw their captain overboard and turn back. At last, when the crews had almost lost their wits from fear, they came into favorable winds. Birds were seen, and the ships followed their flight to the Southwest. After a time they saw green branches drifting in the water, and the wind became sweet and fragrant.



One night they saw a small light.



At dawn the ships' great cannon greeted a beautiful land with tropical plants and birds of gleaming colors.



Awe-struck brown natives swarmed around the big, white-winged monsters that had risen out of the sea.

Columbus, convinced that his charts had been right and that he had reached islands off the Asiatic continent, now sailed north in search of Zipangu (Japan). He crossed the Caribbean Sea in all directions and saw many beautiful islands. Every moment he expected to sight the gleaming towers of Zipangu behind these isolated jungles.

In vain. While Vasco da Gama succeeded in bringing precious cargoes from the real Indies Columbus's efforts seemed an utter failure. Four times he crossed the Atlantic to find the Asiatic fairylands. Poor and forgotten he died in Valladolid in 1506 without having realized the vast importance of his discovery.

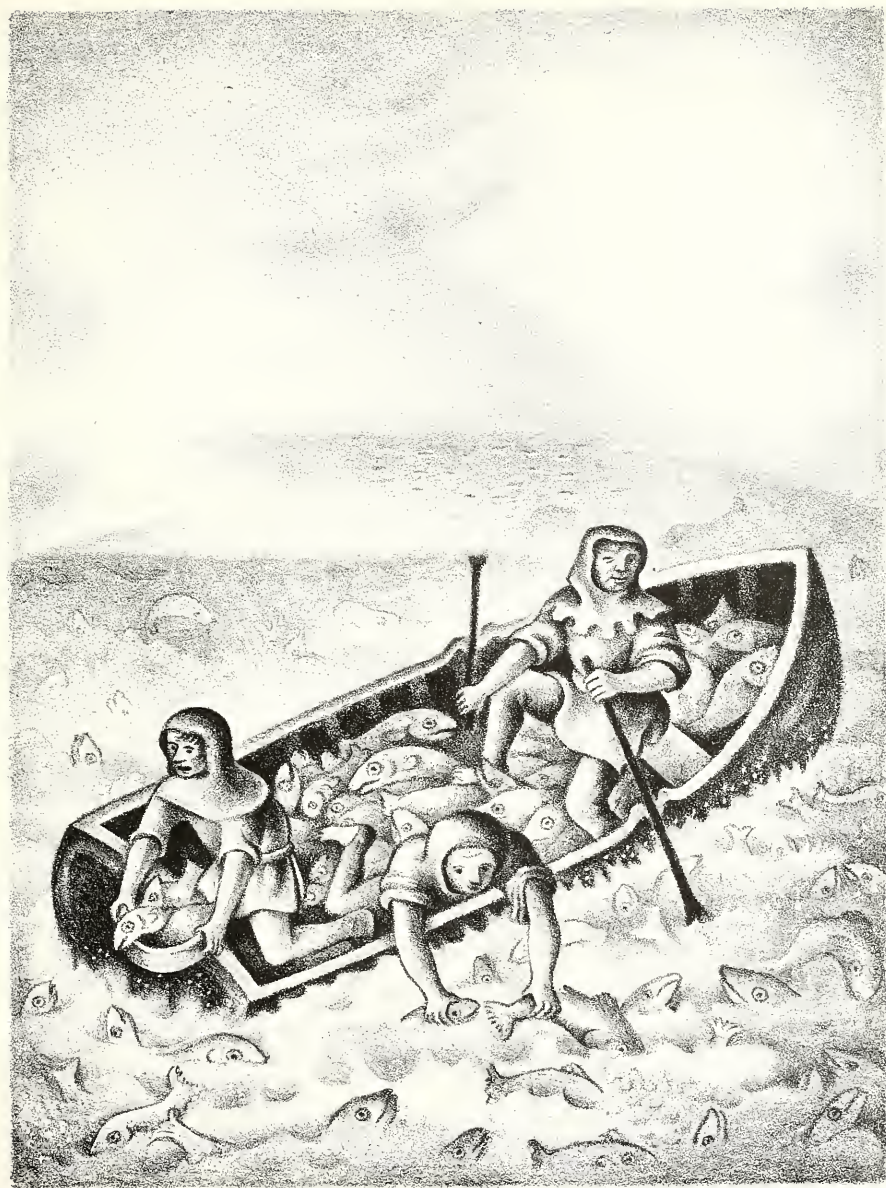
But Portugal had become uneasy after Columbus's first return. Spain might capture the Indian trade. They therefore went to the Pope to get from him an equal division of the globe. The Pope divided the globe with a line that went 37 degrees west of the Cape Verde islands. All land discovered east of this line was to belong to Portugal, all land west of it to Spain!



About the crossing of the Atlantic by John Cabot in the year 1497 history tells an uncertain tale.

Cabot was an Italian merchant who had settled in Bristol, England. Ignoring the Pope's division of the globe he sailed off to the West to find for England the western way to India. And it is told that he saw a barren land, probably the American continent, eighteen months before Columbus first sighted the mainland. Off the coast, at what is now the Newfoundland Banks, he found such an abundance of cod that he just had to shovel them into the boat, he said. And this gave rise to the great Newfoundland fisheries.

When Cabot returned to England, the king, Henry VII, was very pleased with the discovery. To show his gratitude he gave from his privy purse "10 Pounds to hym who founde the new Isle." And with the generosity of a prince in a fairy tale, Cabot distributed imaginary isles in the Atlantic among his friends and creditors.



In 1500 the Portuguese Cabral sailed for India with a flotilla of caravels. Sailing too far West in the region of the trade winds, he was greatly surprised to sight land in the Southwest. Immediately one of the ships returned to report the discovery while the rest continued on toward the Cape of Good Hope.

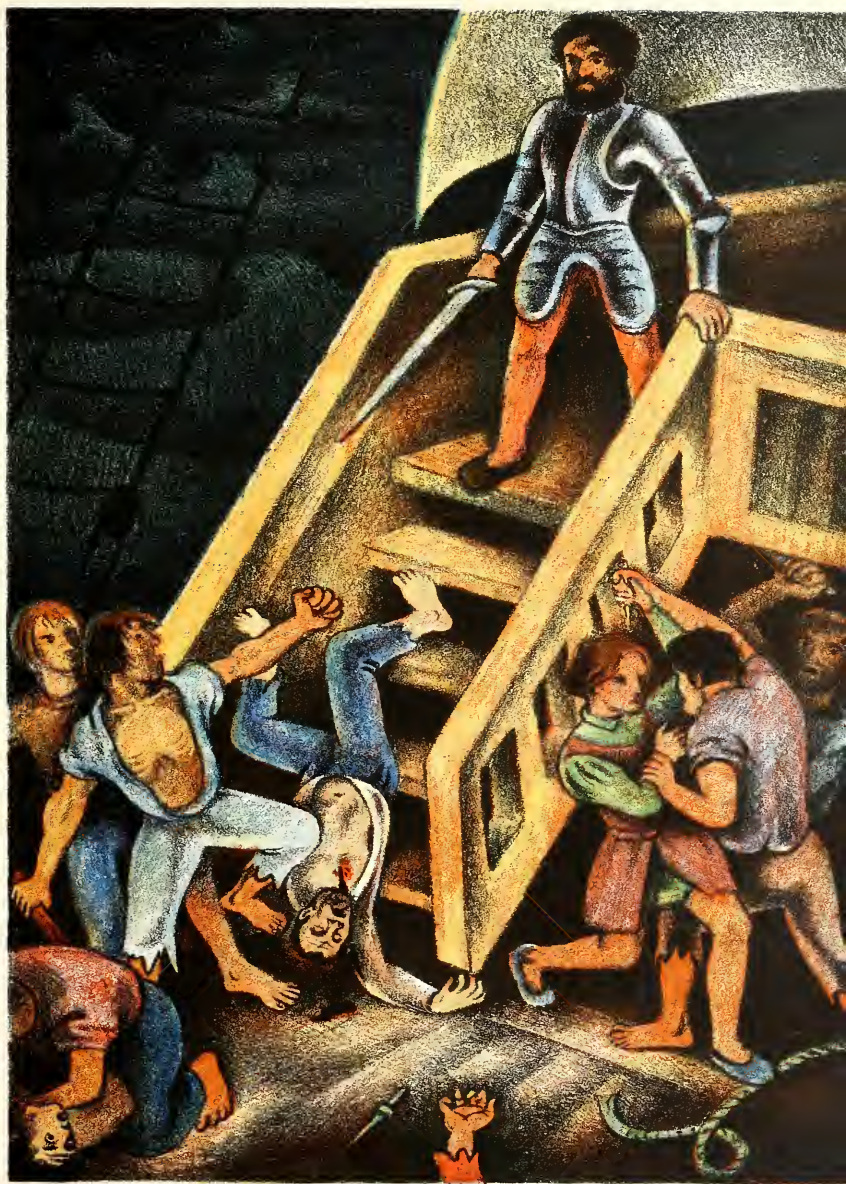
A fleet of caravels was sent from Portugal to explore the coast Cabral had reported. Among the pilots was Amerigo Vespucci. He was a clear minded man and on this and on later expeditions he studied the coast of the new land in the West. He was the first to conclude that, not islands, but a vast new continent had been discovered. He drew a chart of the new land and called it "Mundus Novus" (New World). After a time, the whole world adopted the name America in honor of the man who first recognized it as a great continent.



It was a hard blow to Spain that their explorations of the Atlantic had not opened a way to India. But they did not give up hope, and after Balboa in 1513 had seen "the other ocean," separated from the Atlantic only by an isthmus of forty-five miles, a feverish search began for a passage to Asia in the North, the South, and in the middle of this long stretched barrier, the New World.

The most likely possibility seemed to be in a southern route. And the Portuguese Magellan in Spanish service opened the road. He was an excellent sailor and a strong personality, and had gained valuable experience from a previous voyage to the Malay Peninsula. In 1519 he left Seville as the leader of an expedition of five ships, with official sailing orders, "westward bound." The goal was, as often in these times, kept a secret to avoid competition. The crews were not informed of their destination before they left the harbor.

Magellan's five ships were old and rotten, manned by motley crews. From the first, the men were mutinous, thinking it madness to search a new way over endless and unknown seas, where they would certainly all perish by shipwreck or starvation. Only with the greatest cunning and through his iron will could Magellan master his men.



After a dismal voyage, however, the ship reached the South American coast safely. For fifteen weary months, under growing difficulties, they followed the coast southward, trying to find a passage. At last they found an opening, and Magellan felt certain that this was a strait, separating America from a large Antarctic continent. One ship he had already lost by shipwreck, and now another deserted and returned to Spain. But with the remaining three Magellan fought his way through a barren labyrinth of precipitous rocks, and in five weeks he had led his expedition through the three hundred mile strait, one of the world's most dangerous waters—now named for him.



Two years later a ship, worm-eaten, with forests of seaweed on her hull, appeared south of the Cape of Good Hope, anxiously avoiding Portuguese vessels which would have confiscated her booty. It was Magellan's ship, the *Victoria*. Magellan himself had been slain by natives in the Philippines. Of the two hundred and thirty-four men who had left Spain three years before, only thirty-one completed this first voyage around the world.

The return of the *Victoria* proved that Columbus was right, that the world was round and that India could be reached by sailing West.

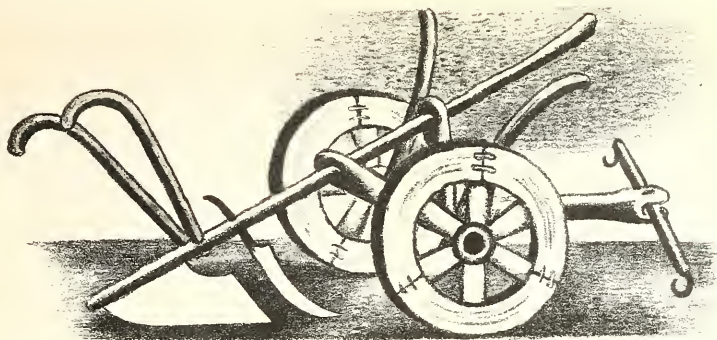
Besides her discoveries, the *Victoria* brought great riches that were the beginning of Spain's trans-Atlantic trade. Spanish ships sailed with treasures from the Orient across the Pacific to the Isthmus of Panama. There the cargoes were unloaded, carried over land to the Atlantic coast, and reshipped for Spain.

Hidden in the jungles of Central America, the Spaniards now discovered the Aztec kingdoms of high culture, rich in silver and gold. Greedily they killed and robbed these peoples and the "golden galleons" carried the ill-gotten spoil across the Atlantic to Spain.





The treasure ships were a luring bait for sea robbers. And buccaneers and privateers were well seen and secretly encouraged by Spain's enemies, England, France, and Holland, who had gained a foothold in North America while Spain was busy guarding her monopolies in the West Indies.



The English, French, and Dutch, in turn, tried again and again to find a northern passage to India. But after Baffin's report in 1616, that the strait between America and Greenland was landlocked, all further endeavors were abandoned for centuries. But in the search the whole North American coast had been explored, even far up into the North, and a profitable trade in fish and fur had begun with the natives. Soon traders settled in North America.

In the seventeenth century poverty and religious intolerance in Europe made life unbearable for peasants and burghers alike. More and more the English, French, and Dutch were driven across the Atlantic in search of freedom.

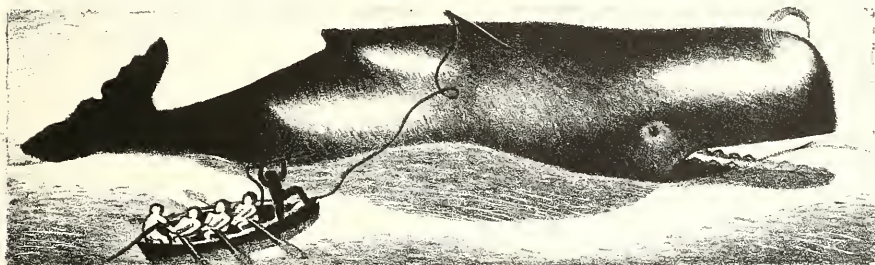
But the voyage across was a terrible trial. Officers and crew were rough, only brutal discipline could keep order. Often the captain depended more on superstition and guesswork than on nautical knowledge. His astrologer helped him lay down the ship's course by predicting wind and weather ahead.

The vessels were small and leaky, and their top-heavy hulls rolled ruthlessly in the ocean's swell. On deck death lurked. During a storm barrels and deck cargo often tore loose with the same fury as the stampeded cattle in the hold. Ropes and sails were torn to shreds, boats smashed to pieces. All lights were extinguished, and the passengers, worn out with seasickness and fear, were locked into their overcrowded quarters below deck in total darkness. Clothes and mattresses and food were soaked with brine. The common sleeping quarter was appallingly filthy. Besides, the stench from livestock, rotting food, and foul water suffocated the poor travelers.



Even if the ship did not founder, death took heavy toll. Smallpox and typhoid, starvation and accidents were to be expected. It took courage and determination to start on such a voyage. No wonder that many of the early emigrants changed their minds at the last moment, preferring to turn back. For when they left, they left for good, without hope of ever seeing their native lands again. Yet in spite of great hardships and dangerous voyages, one small vessel after the other unloaded its human cargo on the shores of the New World.

These pioneers fought and worked. They succeeded in striking root in the New World and became a hardy and adventurous people. Soon they started to trade with Europe and became skilled in seamanship.



The New Englanders learned from the Indians to catch whales. At first they used small open boats near the coast, but soon they built larger boats and followed the whales out into the open Atlantic. Off the coast they met with a strange new phenomenon; they came upon a wide and strong stream, flowing steadily from South to North, regardless of tide and wind. This "river" was bluer than the surrounding waters, and always much warmer. There was an abundance of dolphin, dogfish, and flying fish, and there were plenty of whales on account of this rich food supply.

The whalers followed the stream South and North. It was always the same, coming across the ocean from the Gulf of Guinea, following the coast of America northward from the Mexican Gulf, then going straight across the Atlantic to northern Europe.

And soon all American shipmasters had learned to use this "Gulf Stream" when going to Europe, and to avoid it when homeward bound.

Accurate navigation and chart making were still impossible, and a shipmaster could not know the exact position of his ship in the open sea. Latitude could be exactly determined with Newton's sextant, a great improvement on the old astrolabe. And through Mercator's parallel projection a ship's course could be laid down in its right angle and in a straight line.

But as yet no reliable way of determining longitude had been found. Among the fantastic and difficult ways proposed to settle the problem was a suggestion to watch the almost daily eclipses of Jupiter's moons which may be seen at the same time wherever Jupiter is visible. But most ships could not have telescopes that were powerful enough for this work; also, observations through a telescope are very difficult on a heaving ship.

Another plan was to anchor ships along the most traveled routes on the Atlantic and have them shoot off rockets at exactly twelve every night. Ships could then calculate their approximate longitude from the difference between their own time and the midnight signal. But clocks were all too unreliable to be depended upon. An accurate clock was an absolute necessity.

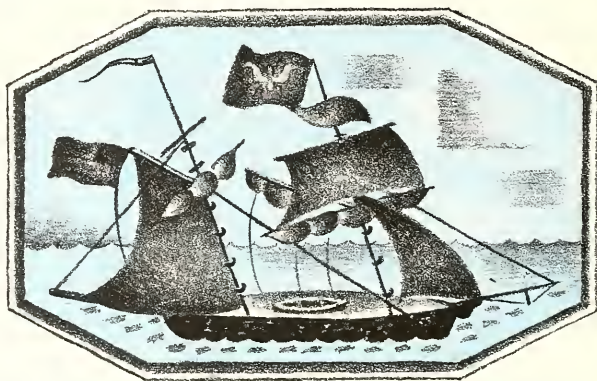


England was now the mistress of the seas and, recognizing the importance of a good timepiece, in 1713 she offered a reward of twenty thousand pounds for a watch exact enough to determine longitude within thirty miles.

John Harrison, a watchmaker, applied himself vigorously to the task, but after several unsuccessful tryouts the government gave up hope and appointed astronomers to compute tables of lunar distances instead. In 1767 the first of these tables was published. But in that same year John Harrison sent his son to the West Indies to try out a new watch. The watch lost but one minute, fifty-four and one-half seconds on the long voyage. The reward was won. The first chronometer had been made, and the exact chart-making of the ocean could begin.



In the next fifty years the Atlantic lost its vague outlines. The sailors knew their positions at sea, which stretches to avoid, and which to seek. Ships crossed the Atlantic in all directions. Well-armed fleets of East- and West-Indiamen jogged along, stately and ponderous, on their profitable journeys, their broad and deepgoing hulls loaded with precious goods. Jokingly the sailors said that the broad bow of an Indiaman could push a cocoanut ahead for miles, and that a bunch of bananas could be carried from the West Indies to England in the dead-water under her lee-quarter.

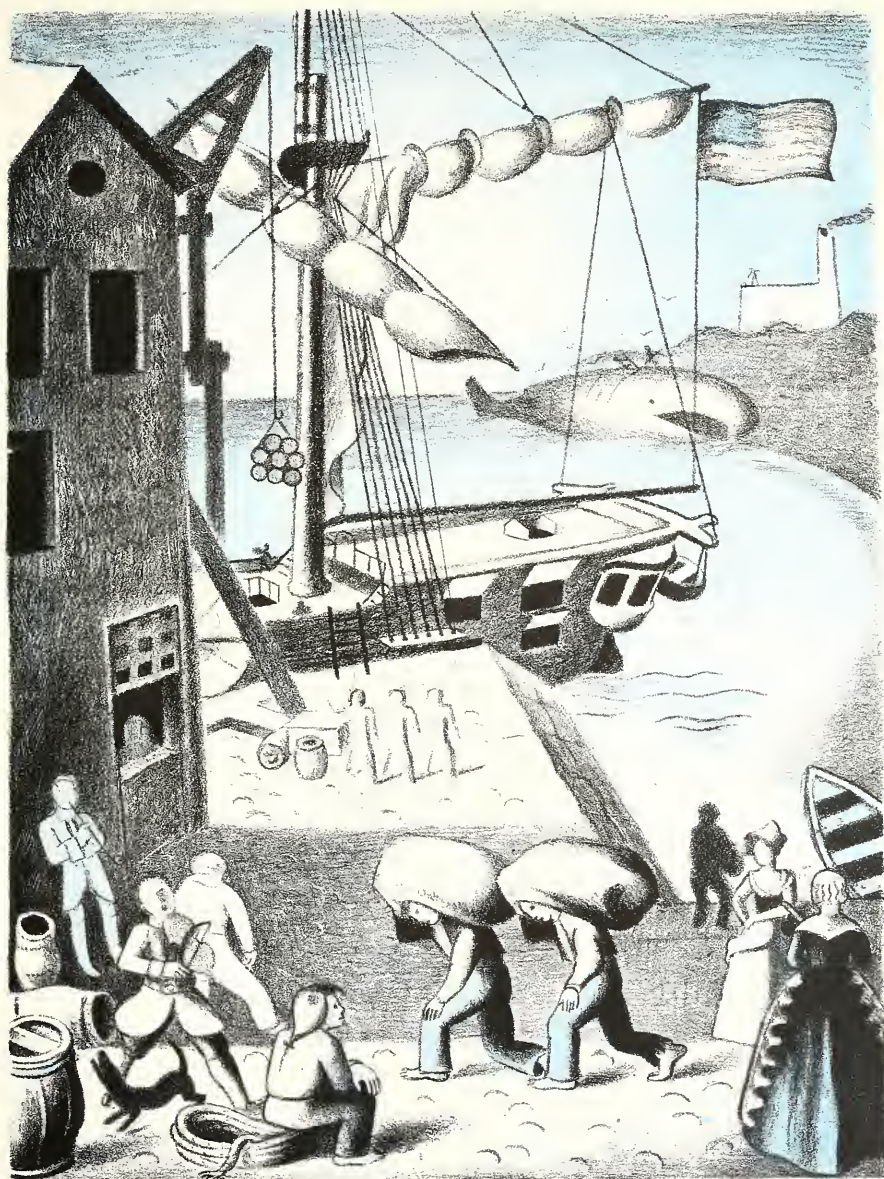


By the English monopolies, the Yankees were excluded from nearly all this profitable trade, but they loved trade, adventures, and hazards. They constructed a new type of vessel, a small and light craft, much easier to handle than the European ships. With these fastrunning ships, they started to carry contraband in the West Indies.

In the slave trade with the African shores these swift ships were also of great advantage. For the quicker the passage the fewer slaves would perish in the overcrowded holds.

In the half century after the American Revolution the tea and opium trade with China, the discovery of gold in Australia and California, and the increasing trade between Europe and her colonies in America demanded faster passages.

Now the Americans, with their tradition of fastrunning ships and their great resources of oak for shipbuilding, came into their own on the Atlantic.



Out of the small American trading ship grew the clipper, a ship with slender lines and towering masts, the crowning glory of the shipbuilder's art. These clipper ships with alluring names like *Flying Cloud*, *Rainbow*, *Sovereign of the Sea*, skimmed the waves, pressed to the breaking point by their ambitious captains and their iron-disciplined crews. The run of the clipper ship *Dreadnought*, from Queenstown to New York in ten days, is still the fastest passage recorded for any sailing ship.

Now an American, Robert Fulton, created a strange new boat, a small black craft rolling along on two wheels with clanking joints and hissing steam, with smoke and embers emerging from a long thin pipe between her masts.

In 1819 the first of these ships crossed the Atlantic, sailing and steaming. She was the *Savannah*. Several times on her way across ships tried to come to her rescue, mistaking her for a ship on fire. When she came into the harbor of Liverpool, the docks were crowded with people wanting to see this new wonder.

Soon the clipper ships and steamers were racing each other in spectacular contests on the Atlantic voyages.

After screw-propellers replaced paddle-wheels, and more powerful engines came into use, the era of the clipper ships declined rapidly, though for a time the clippers were still used by emigrants to save money.





Yet it took weeks to exchange messages across the Atlantic. Most of the European countries had been linked by telegraph, and submarine cables had been laid over small distances and in relatively shallow water. But that a cable could be laid over thousands of miles in the unmeasured abyss of the Atlantic seemed impossible.

In the middle of the nineteenth century a series of soundings was taken in the North Atlantic. They revealed formations of high rocks and deep holes. But between Ireland and Newfoundland a smoothly undulating plateau was found, and this plateau seemed like a natural soft bed for a cable.

It was decided to venture the laying of a cable there, and the 2500 miles of wire rope necessary were manufactured.

There did not exist any ship large enough to hold the whole cable, but the English and the American governments each had a battleship fitted out as cable-layer. And with great festivities the shore end was landed in Valencia Bay, Ireland, in the summer of 1856.

The public followed the start of the enterprise with great enthusiasm. But it soon became obvious that "The Telegraph Company" had taken a very heavy burden on its shoulders. It had to struggle with storms during the paying out of the cable, with inadequate material, and with a growing adverse public opinion. After the second unsuccessful attempt the venture was marked as "a mad freak of stubborn ignorance."

But at the third attempt they succeeded in laying the cable across the Atlantic, and in the summer of 1857 the line was opened by an exchange of telegrams between the Queen of England and the President of the United States. Now the enterprise was praised as "the great feat of the century." But a very strong electric current was thought necessary for this long distance, and after three months the cable was ruined beyond repair.

Ten years later it was decided to put out a new cable. And this time there was a ship large enough to hold the whole cable. It was *The Great Eastern*, a pioneer in size and design, one of the famous boats in the history of steamships. Originally built for troop transport to Australia, tried out in passenger carrying on

the Atlantic, she had proved too big and uneconomical, and had been laid up for many years. But as a cables ship she did very well, and two cables were laid from her. Since then the telegraph connection between the Old and the New World has never been wholly interrupted.

The cable laying was a great impetus to submarine exploration. Since ancient times rough soundings had been made near coasts, but the great depths were thought barren and lifeless, filled with eternal ice. In 1860 a damaged cable was fished up from a great depth in the Mediterranean and was found densely covered with small living organisms. This conclusively proved the existence of life in the great watery deep, and a systematic exploration of the ocean bed began.

Sounding was a difficult problem. It took hours to get a couple of thousand fathoms down as the weights on the ropes must not be too heavy to get them up again. And the friction of the water on the ropes was so great that it was impossible to say exactly when bottom was touched.

An American invented the first really practical sounding apparatus. Attached to the line was an iron ball that released itself automatically when bottom was touched.

By using piano wire instead of rope, the friction of the water was also partly overcome.

The first great expedition for the exploration of submarine regions was sent off by the English in 1873. The ship, *Challenger*, was a floating laboratory, and was staffed by scientists, artists, and photographers. They collected an immense material, sounding the deeps, comparing temperatures, bringing up samples of the bottom and of animal and plant life in different regions and depths. A new and strange world, conforming to quite different laws, was discovered. Probably no expedition since Magellan's had enlarged the knowledge of our world so much.

Fourteen years later the U. S. survey vessel, the *Blake*, made another epoch-making expedition, and on the results of these two ventures the science of modern oceanography is based. Since then, nearly all seagoing nations have been engaged in marine studies.



Submarine boats have been improved with modern methods of engineering, but travel under the sea is still so dangerous and uncomfortable that it is only in times of great stress such as war that submarines are much used.

But scientists in their up-to-date steel armor and diving apparatus penetrate to



ever greater depths. William Beebe from a steel globe, the Bathysphere, broadcasted a description of submarine life. Today we know that the Atlantic is the home of myriads of strange creatures. Below surface in tropical waters there is a paradise of corals, plants, fish and colorful rocks.

But even in the faint light twenty fathoms down the colors fade away. A cold, eternal night grows from the deep. Miles down no ray of the sun ever penetrates, and no plants can thrive. The pressure of the water is so great that a human body would be pressed as thin as tissue paper. Yet myriads of jellylike animals live down there. Flashing in all the colors of the rainbow they shoot about, sustaining life on a constant rain of dead organisms or by devouring each other. And even in the stagnating waters of the "Nares Deep," the greatest known depth in the Atlantic, there is life.

On the rocky slopes and ridges the water circulates. Great masses of warm and cold water, keeping distinct from each other, are moving about in all directions, at different depths.

The best known of the cold currents is the "Labrador Current." In spring it carries icebergs along from the Arctic regions far toward the South.

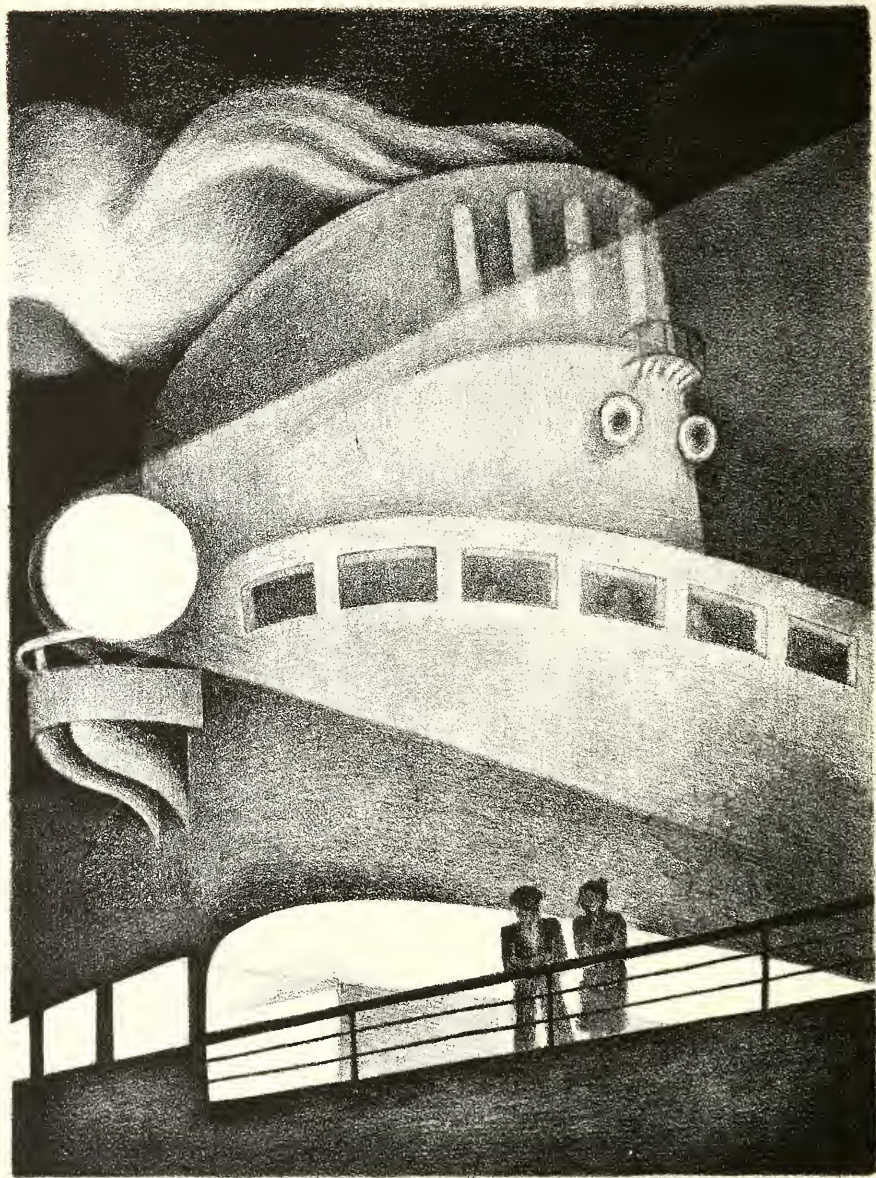
The icebergs are often enveloped in dense fog and are a great menace to ships.

After the catastrophe of the *Titanic*, when a great trans-Atlantic liner was sunk by a collision with an iceberg, an ice patrol was established. In spring patrol-ships continually follow the icebergs in the North Atlantic and report their positions to the shores, and naval radio stations broadcast the data. Today each ship crossing the Atlantic knows the exact position of every iceberg near her course.

Another great danger to ships are the wrecks cruising about on the ocean as if guided by invisible hands. Many of them disappear for a time from the surface, then suddenly rise out of the waves again, their hulls black and weather-beaten, their sides overgrown with seaweed. They may drift around for years, and it sometimes happens that a wreck last seen in tropical waters is recognized in the far North. A fleet of revenue cutters constantly cruises about in the Atlantic looking for these derelicts. They ram them or set them afire, or even have to shell them to make them sink. The government regularly publishes charts of all recorded wrecks, giving each a serial number.

On the once trackless waste of the Atlantic there are no longer many surprises for the accomplished master of a big ship. Nearly everything has been explored





and mapped out so carefully that he knows the exact position of his ship at every moment. When near land, he can follow his maps and check by sounding and by taking samples of the bottom. Shoals and isles, points off the coasts and entrances to harbors have been marked. Lights in different colors are blinking, buoys are ringing and whistling, beacons of various shapes and colors guide him and warn him of danger. When in the open sea he may keep his exact course by help of maps, compass, chronometer, sextant, and radio—the great modern contribution to navigation. Danger on sea voyages has been greatly overcome; out on the ocean the ship is no longer a small, isolated world. By radio she keeps in communication with other ships and with the shores. And in emergencies she calls others to her assistance. When an S.O.S. is heard, the great shore stations immediately repeat it. Within half a minute every radio correspondent stops, and everybody listens to the faraway distress signal. Soon ships from all sides come to help.

On strictly appointed “sea lanes” giant steel palaces, carrying thousands of passengers, run between the Old and the New World. Through tempests and calms these ships race, their streamline bodies thrust forward by huge engines. They fight to beat each other’s records in speed, to win the most prized trophy, “the Blue Ribbon of the Atlantic.” The *Bremen* holds it today for making her maiden voyage in four days, seventeen hours. Coming improvements in ship technique will certainly better this record, if only by a few hours.

Sound transmission is another conquest. For a long time Guglielmo Marconi experimented with wireless signals. In 1906 he decided to try and send these signals across the Atlantic. He built a powerful wireless station in Poldhu, Cornwall, England. Then he proceeded to St. Johns, Newfoundland, where he flew balloons containing receiving apparatus from Signal Hill. When everything was ready, the Morse signals for the letter S were sent from the Poldhu station and distinctly heard in St. Johns—wireless telegraphy had annihilated space over the Atlantic. Within a year, the first trans-Atlantic ethereal message traveled East from Glace Bay, Cape Breton, Nova Scotia, to England, and in 1927 radio telephone communication was established between New York and London. Sound had flown the Atlantic.



Up to a few years ago, there remained one more irresistible hazard over the



Atlantic. Man had explored the surface and delved in the depths; now he was

lured by a new element, the air, that promised a way where the routes become smooth and uniform, where oceans, continents, shoals, and ice barriers are passed with equal facility.

Dangers there were, all the more real because known and reckoned with, but numerous bold spirits disregarded the dangers for the possible achievement.

In 1919 the *NC 4*, a flying boat, flew from America to Spain, stopping at the Azores. Prevailing winds are more favorable from West to East, and in that same year, in one wild flight of sixteen and a half hours, an English airplane piloted by Captain I. Alcock and Lieutenant A. Whitten Brown spanned the ocean from Newfoundland to Ireland, the first flight over the Great Circle that had been the route of so many voyages of discovery.

But no one had made that flight alone.

In 1927, a winged craft, *The Spirit of St. Louis*, left New York and flew aloft. After thirty-six hours of skilled navigation, one single man alighted from this plane at Bourget Field in Paris. He said, "I am Charles Lindbergh. I have a letter of introduction." He did not need it. The whole world was waiting for news that the space over the vast watery barrier had been conquered at last in a solo flight.

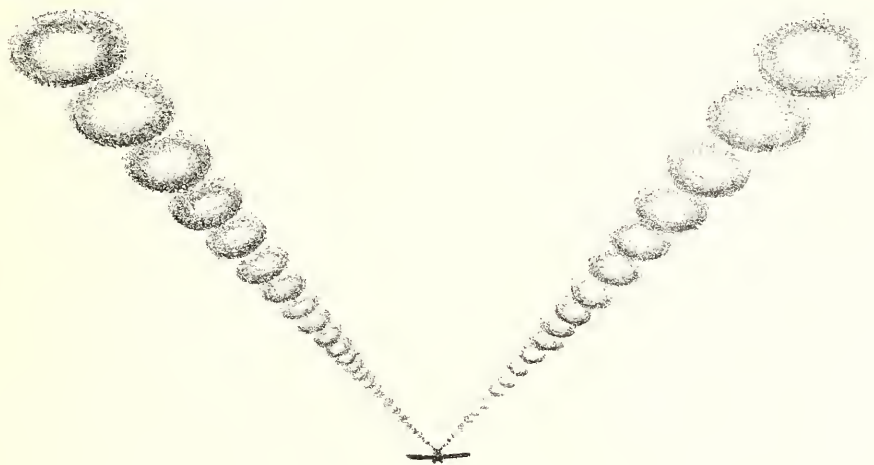
Since then many successful flights have been made. Captain D. Costes and Lieutenant C. Bellonte were the first to fly from Paris to New York. Amelia Earhart was the first woman to span the Atlantic alone. In the summer of 1933, General Italo Balbo led a flotilla of over twenty sea planes from Italy to Chicago by way of Greenland, and flew the return trip by way of the Azores.

Dirigibles, too, have played their part. In 1919 an English airship, *R 34*, flew from Scotland to New York. Much later, in 1928, the *Graf Zeppelin* was the first airship to try out trans-Atlantic air transport, to travel on a scheduled date and carry many passengers. When the giant airship thundered over the city with all her lights ablaze, New Yorkers saw history in the making, and sirens and beacons gave recognition. Now the *Graf Zeppelin* flies regularly between Europe and South America saving much time in this long distance.

Perhaps in the near future seadromes will be anchored at intervals across the Atlantic to serve as stopping places for passenger planes which will take from twenty-four to thirty-six hours between America and Europe.

Perhaps the time will come when man will be independent even of fog and storm by riding above them. In his rocket plane he will span the Atlantic with the precision of a clock. He will go up from New York and use motor and propeller to reach the stratosphere, where the rocket machinery will be put into use. With incredible speed the craft will be shot hissing forward. After three quarters of an hour, motor and propeller will again be taken into use, and the plane will glide down over the roofs of Paris.

And then the conquest of the Atlantic's Blue Ribbon will continue in an era of seconds—who knows?



CONQUEST OF THE ATLANTIC IN OUTLINE

DURING THE MIDDLE AGES	The Atlantic known as the great outer sea, "The Sea of Darkness."
9TH TO 11TH CENTURIES	The Vikings discover Iceland, then Greenland, then North America (about A.D. 1000).
14TH CENTURY	The Genoese start the exploration of the South Atlantic, discover Madeira, the Canaries, the Azores, their way South barred by the fabulous "Cape Non."
14TH AND 15TH CENTURIES	Prince Henry of Portugal, "Henry the Navigator," the opener of the Atlantic. The first to organize scientific navigation.
15TH CENTURY	Bartholomeu Dias, Prince Henry's pupil, the first to reach the Atlantic's southeastern cape, the Cape of Good Hope. He also was the first who left the coast and ventured out into the open sea, relying on scientific navigation to steer his course.
	Revival of the old idea that the world is round revives the possibility that Asia might be reached by sailing across the Atlantic.
	Columbus crosses the Atlantic from Spain to the West Indies four times. His first expedition in 1492.
	John Cabot from England to the New World in 1497. Probably the first in this period to see the mainland.
	Cabral touches the southern continent in his way to the Cape of Good Hope in 1500.
15TH-16TH CENTURY	Amerigo Vespucci is the first to conclude that the newly found lands are not islands, but the coast of a vast continent forming the western shore of the Atlantic.
16TH CENTURY	Magellan on his way around the world finds the southwestern way out of the Atlantic.
	First mercantile fleets, Spanish ships, carry treasures from New Spain crossing the Atlantic.
	Sea-robbers, buccaneers, and privateers.
16TH-17TH CENTURY	English, French, and Dutch sail to North America. Trade with Europe begins.
17TH CENTURY	Emigrations increases.

18TH
CENTURY

New Englanders whaling and fishing off the western shores of the Atlantic discover Gulf Stream.

The first chronometer makes it possible to calculate exact longitude; the exact chart-making of the Atlantic begins 1767.

19TH
CENTURY

A demand for ships that can make fast passages. The Americans develop their small privateers into clippers and come into their own on the Atlantic.

In 1819 the first steamship, the *Savannah*, crosses the Atlantic (partly steaming, but mostly sailing).

In the middle of the nineteenth century, steamships generally replace sailing vessels.

In 1857 the first transatlantic cable.

In 1860 submarine exploration of the great depths begins. The first great expedition, the *Challenger* expedition, by the English—1873. In 1887 the American *Blake* expedition. On these two ventures the science of modern oceanography is based.

20TH
CENTURY

First wireless signals sent across the Atlantic by Marconi in 1906.

Followed by ethereal messages within a year.

1919, the first flying boat, *U. S. N. C. 4*, flies from America to Spain via the Azores.

Correction, Page 55, ¶11
Alcock and Brown flew to
Ireland (not Greenland).

1919, an English airplane, piloted by Captain I. Alcock and Lieutenant A. Whitten
Brown, flies from Newfoundland to Greenland.

1919, an English airship, *R. 34*, flies from Scotland to New York.

1927, Charles Lindbergh flies alone from New York to Paris.

1927, radio telephone communication is established between America and Europe.

1928, the *Graf Zeppelin* begins transatlantic air transport.

1933, the Italian General Balbo with his flotilla of seaplanes flies from Italy, via Greenland, to Chicago and returns via the Azores.





